

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A heat-softening heat-radiation sheet comprising a polyolefin-based heat-conductive composition which comprises ~~a polyolefin~~ an ethylene/α-olefin/non-conjugated polyene random copolymer and a heat-conductive filler, wherein the composition has a softening point of 40°C or above, ~~has~~ a thermal conductivity of 1.0 W/mK or higher, ~~has~~ a viscosity at 80°C of from 1×10^2 to 1×10^5 Pa·s and ~~has~~ a plasticity at 25°C in the range of from 100 to 700.

Claim 2 (Currently Amended): The heat-softening heat-radiation sheet according to claim 1, ~~wherein said polyolefin is a polyolefin comprising further comprising~~ an α-olefin polymer ~~and~~ having a softening point of from 40°C to 120°C.

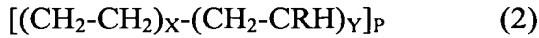
Claim 3 (Currently Amended): The heat-softening heat-radiation sheet according to claim 1, ~~wherein said polyolefin comprises an α-olefin polymer 2, further comprising, an ethylene/α-olefin copolymer and an ethylene/α-olefin/non-conjugated polyene random copolymer.~~

Claim 4 (Currently Amended): The heat-softening heat-radiation sheet according to claim 1, ~~wherein said polyolefin comprises further comprising a polyolefin comprising polymerized units of an α-olefin represented by the general formula (1):~~



wherein n is an integer of 16 to 50.

Claim 5 (Currently Amended): The heat-softening heat-radiation sheet according to claim 3, ~~wherein said~~ 1, further comprising an ethylene/α-olefin copolymer is represented by the general formula (2):



wherein R is an alkyl group represented by $-\text{C}_n\text{H}_{2n+1}$ where n is a positive integer; and X, Y, and P are positive integers;

and having a viscosity at 25°C in the range of from 200 cSt to 1,000,000 cSt.

Claim 6 (Currently Amended): The heat-softening heat-radiation sheet according to claim 3 1, wherein said ethylene/α-olefin/non-conjugated polyene random copolymer has a Mooney viscosity (JIS K 6395) at 100°C in the range of from 5 to 50.

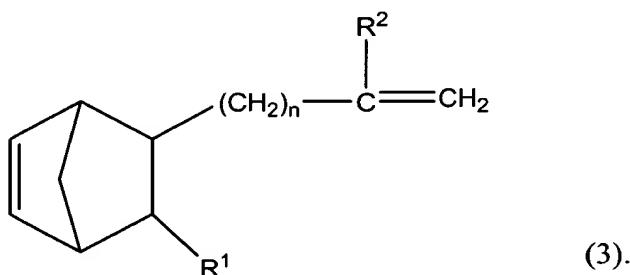
Claim 7 (Original): The heat-softening heat-radiation sheet according to claim 2, wherein said α-olefin polymer is derived from two or more α-olefins having a different number of carbon atoms.

Claim 8 (Original): The heat-softening heat-radiation sheet according to claim 3, wherein said ethylene/α-olefin copolymer is a mixture of two or more ethylene/α-olefin copolymers having different viscosities at 25°C.

Claim 9 (Currently Amended): The heat-softening heat-radiation sheet according to claim 3 1, wherein said ethylene/α-olefin/non-conjugated polyene random copolymer is a mixture of two or more ethylene/α-olefin/non-conjugated polyene random copolymers having different ethylene contents.

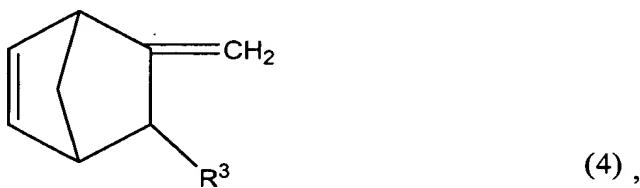
Claim 10 (Currently Amended): The heat-softening heat-radiation sheet according to claim 1, wherein said heat-conductive filler is at least one selected from the group consisting of a metal, an inorganic oxide and an inorganic nitride.

Claim 11 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the ethylene/ α -olefin/non-conjugated polyene random copolymer comprises at least one vinyl group-terminated norbornene compound of formula (3)



wherein n is an integer of 0-10, R¹ is a hydrogen atom or an alkyl group having 1-10 carbon atoms, and R² is a hydrogen atom or an alkyl group having 1-5 carbon atoms.

Claim 12 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the ethylene/ α -olefin/non-conjugated polyene random copolymer comprises at least one vinyl group-terminated norbornene compound represented by formula (4)



wherein R³ is a hydrogen atom or an alkyl group having 1-10 carbon atoms.

Claim 13 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the ethylene/α-olefin non-conjugated polyene random copolymer comprises copolymerized units of at least one selected from the group consisting of 5-vinyl-norbornene and 5-methylene-norbornene.

Claim 14 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the heat-conductive filler is present in an amount of from 66-89% by weight.

Claim 15 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the ethylene/α-olefin/non-conjugated polyene random copolymer has an ethylene content of 63% or greater.

Claim 16 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the heat-conductive filler is at least one selected from the group consisting of iron, aluminum, nickel, silver and gold.

Claim 17 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the heat-conductive filler is at least one selected from the group consisting of silicon oxide, aluminum oxide, zinc oxide, iron oxide and magnesium oxide.

Claim 18 (New): The heat-softening heat-radiation sheet according to claim 1, wherein the heat-conductive filler is at least one selected from the group consisting of aluminum nitride and boron nitride.

Claim 19 (New): The heat-softening heat-radiation sheet according to claim 1,
further comprising an organohydrogenpolysiloxane and a catalyst, or an organic peroxide.

Claim 20 (New): The heat-softening heat-radiation sheet according to claim 1,
wherein the ethylene/ α -olefin/non-conjugated polyene random copolymer is cross-linked.

BASIS FOR THE AMENDMENT

Claims 1-20 are active in the present application. Claim 1 has been amended to require the presence of an ethylene/ α -olefin/non-conjugated polyene random copolymer. Original Claims 2-6 and 9-10 have been amended for clarity and in conformance with the amendment to Claim 1.

Support for new Claim 11 is found on page 5, line 26 through page 6, line 5. Support for new Claim 12 is found on page 6, lines 5-9. Support for new Claim 13 is found on page 6, lines 10-11. Support for new Claim 14 is found in Examples 1 and 4 of Table 2 on page 13. Support for new Claim 15 is found on page 6, lines 23-24. Support for new Claims 16-18 is found on page 7, lines 26-31. Support for new Claims 19 and 20 is found on page 7, lines 19-24. No new matter is believed to have been added by this amendment.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Hamlin for the helpful and courteous discussion of March 23, 2004. Applicants further thank the Examiner for indicating in the Office Action of February 12, 2004 that the subject matter of Claims 3, 5, 6, 8 and 9 is allowable if rewritten in independent form or to otherwise include all of the limitations of any claims from which the allowed claims depend. During the discussion, Applicants' U.S. representative discussed the rejections of record and noted that the prior art relied upon by the Office to reject the claims of the present application as obvious do not disclose an ethylene/ α -olefin/non-conjugated polyene random copolymer.

Applicants have disclosed a polymer-containing sheet that has heat-softening and heat-radiation properties. The invention sheet may be placed upon electronic components to help dissipate heat from the electronic components. The invention sheet may be readily attached to or removed from electronic components (page 3, lines 4-6). The invention sheet acts as a heat sink to remove excess heat from the electronic components.

The invention sheet contains at least a polyolefin and a heat conductive filler. The polyolefin may be an ethylene/ α -olefin/non-conjugated polyene random copolymer. A commercially available ethylene/ α -olefin/non-conjugated polyene random copolymer is disclosed as Mitsui EPT (page 7, lines 8-11). In one embodiment of the invention the ethylene/ α -olefin/non-conjugated polyene random copolymer is present with an ethylene/ α -olefin copolymer and an α -olefin polymer (page 4, lines 5-8).

The invention sheet exhibits certain physical characteristics such as a thermal conductivity of 1.0 W/mK or higher, a viscosity at 80°C of from 1×10^2 to 1×10^5 Pa•s and a plasticity at 25°C in the range of from 100-700.

The Office rejected original Claim 1 as obvious in view of a patent to Fouts (U.S. 4,545,926). It appears that it is the Office's position that Fouts discloses polymer

compositions that contain conductive particles and that the prior art compositions would exhibit the thermal conductivity, viscosity and plasticity requirements that are a limitation of original Claim 1.

Applicants traverse the rejection on the grounds that the Office has provided no evidence in support of the assertion that the prior art polymer compositions would exhibit the thermal conductivity, viscosity or plasticity properties required by the heat-softening heat-radiation sheet of original Claim 1.

Claim 1 has been amended herein to require that at least an ethylene/ α -olefin/non-conjugated polyene random copolymer is present in the invention sheet. Applicants submit that the disclosure at column 5, line 33 through column 6, line 34 which describes the types of thermoplastic polymers that may be present in the prior art compositions does not include a description of an ethylene/ α -olefin/non-conjugated polyene random copolymer. Amended Claim 1 cannot be obvious in view of Fouts on the grounds that Fouts does not disclose the ethylene/ α -olefin/non-conjugated polyene random copolymer of amended Claim 1.

Applicants respectfully request the withdrawal of the rejection.

In the Office Action of February 12, 2004, the Office asserted that the Information Disclosure Statement filed on November 20, 2003 failed to comply with the requirements of the Patent Rules and Office administrative procedure on the grounds that no list of references was filed with the IDS. An IDS with a List of Related Cases and one cited pending application was submitted on November 20, 2003 as evidenced by the date-stamped filing receipt attached herewith. A copy of the List of Related Cases is attached herewith for the Examiner's convenience. Applicants respectfully request the Office acknowledge consideration of the references provided on the List of Related Cases as considered in the examination of the above-identified application by returning a signed, dated and initialed

Application No. 09/973,924
Reply to Office Action of February 12, 2004.

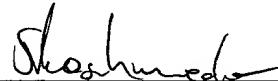
copy of the List of Related Cases or by including a statement in the next communication from the Office indicating that the List and all references cited thereon have been considered.

Applicants submitted a Request for Priority to Japanese Application 2000-312481, filed on October 12, 2000, together with a certified copy of the priority document on October 11, 2001. The Office has not acknowledged priority under §119 in the Office Action of February 12, 2004. Applicants respectfully request the Office acknowledge priority under 35 U.S.C. § 119 in the next communication from the Office.

Applicants submit the amendment to the claims places all now-pending claims in condition for allowance. Applicants respectfully request the withdrawal of the rejections and the passage of all now-pending claims to Issue.

Respectfully submitted,

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